

SODIUM IN FOODS

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A cooperative study by The Connecticut Agricultural Experiment Station and the Connecticut Dept. of Consumer Protection

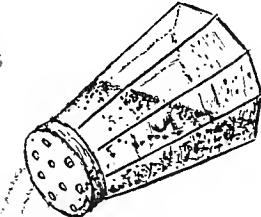
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no. 80

Excessive intake of sodium is now one of the foci of medical interest. Physicians counsel patients on the possible relationship between excessive sodium (salt) consumption and hypertension. They urge decreased sodium intake, especially for those vulnerable, including cardiac and hypertensive populations (3). The Food and Drug Administration has stated that one of its priorities is to find ways to lower the sodium content of processed foods and to educate the public concerning excessive use of sodium (5,7).

The Recommended Daily Dietary Allowance for sodium for adults is 1100-3300 milligrams per day (1.1-3.3 grams) (6). This amount is equivalent to about 3 to 8 grams of sodium chloride, common table salt.

Small quantities of sodium occur naturally in many unprocessed or raw food products. During processing manufacturers add salt (usually sodium chloride) for flavor as in canned vegetables or soups, or as part of a preservative process, as in prepared meats and fish not destined to be canned. In products containing hydrolyzed vegetable protein, large quantities of salt may be present. Salt is formed if the protein is hydrolyzed with acid and the acid is neutralized with alkali.

In this Bulletin we report on the sodium content of some common foods and compare products purporting to be low in sodium with the ordinary products usually not making any claim. When possible we obtained the same brand for both types of product and selected products which would show the range of sodium intake for like products with dissimilar claims for sodium. This information allows consumers to make informed judgements on how much salt they consume and which type of product to purchase.

Methods

Samples were collected in food stores in Connecticut in February, June, and August, 1981. When required, samples were refrigerated for transport to the laboratory and then either refrigerated or frozen until analyzed. Samples were ground (as with crackers) or blended (as with canned vegetables) before analysis. Data for sodium in cottage cheese are from Bulletin 791 of this Station (4). Sodium was determined by Atomic Absorption Spectrophotometry (1).

Results and Discussion

The amount of sodium claimed on the label per 100 grams of product and the amount found by analysis is shown in the Table. For some of the foods examined the amount of sodium per 100 grams was not stated on the label but all showed the amount of sodium in a serving. There are no labelling requirements for ordinary products, but many of those collected stated on the labels the amount of sodium per serving.

Since consumers purchase for dietary reasons foods purporting to be low in sodium (generally labelled as low sodium, no salt added, salt-free, or "for sodium-restricted diets") we show in the Table, where applicable, the percentage of sodium in the low-salt product compared with the ordinary product. Overall, percentages ranged from a low-salt product with 98% less sodium than the ordinary product to one with only 5% less sodium than the ordinary product. In two cases, spaghetti and melba toast, the amount of sodium in the low-salt product was greater than in the ordinary product. The actual

Product, brand, label	Sodium mg/100g claim found	Percent sodium in low sodium product compared to ordinary product	mg sodium/serving
Baby food, Jr. beef meat dinner with vegetables, Gerber, MSA	-	65	72
Baby food, Jr. beef meat dinner with vegetables, Gerber	-	90	83 / 4-1/2 oz.
Beans, canned, cut green, Featherweight, NSA	10	80	115 / 4-1/2 oz.
Beans, canned, cut green, Shop Rite	360	360	91 / 1/2 cup
Beans, canned, cut wax, Featherweight, NSA	10	95	817 / 1 cup
Beans, canned, cut wax, Shop Rite	-	265	108 / 1/2 cup
Beets, canned, sliced, Featherweight, NSA	45	70	602 / 1 cup
Beets, canned, sliced, Shop Rite	-	90	80 / 1/2 cup
Bread, enriched, Reynolds, low sodium, NSA	-	30	204 / 1 cup
Bread, enriched, Reynolds Sunbeam	-	725	17 / 2 slices
Bread sticks, Stella D'oro for sodium restricted diets	20	133	411 / 2 slices
Bread sticks, Stella D'oro	-	405	34 / 3 pieces
Broth, beef, instant, Herb-ox, low sodium	250	365	104 / 3 pieces
Broth, beef, instant, Herb-ox	-	4220	15 / 4 grams
Butter, sweet, whipped, Land O'Lakes, unsalted	-	35	190 / 4.5 grams
Butter, sweet, whipped, Land O'Lakes, slightly salted	-	155	3 / 1 tbsp.
Cake mix, pound, Diamel, reduced sodium	293	365	14 / 1 tbsp.
Cake mix, pound, Betty Crocker	380	390	83 / 1/10th cake
Candy, chocolate crunch, Estee, low sodium, NSA	95	85	147 / 1/12th cake
Candy, chocolate crunch, Nestle	-	145	59 / 14 grams
Carrots, canned, sliced, Featherweight, NSA	25	50	20 / 14 grams
Carrots, canned, sliced, Shop Rite	-	250	57 / 1/2 cup
Catsup, Diamel, imitation, NSA	-	100	568 / 1 cup
Catsup (Ketchup), Heinz	-	960	14 / 1 tbsp.
Cereal, corn flakes, Van Brode, low sodium, NSA	25	105	134 / 1 tbsp.
Cereal, corn flakes, Kelloggs	-	186	30 / 1 oz.
Cheese, New York cheddar, Heluva Good, salt free	-	380	53 / 1 oz.
Cheese, New York, washed curd, Heluva Good	-	415	216 / 2 oz.
Cheese, cottage, Axelrod's, dry curd, NSA	29	46	236 / 2 oz.
Cheese, cottage, Axelrod's, dry curd, NSA	29	125	52 / 1/2 cup
Cheese, cottage, Axelrod's, dry curd, NSA	-	576	142 / 1/2 cup
Cheese, cottage, Axelrod's, lowfat	-	695	654 / 1/2 cup
Cheese, cottage, Axelrod's, lowfat	-	55	789 / 1/2 cup
Cheese, cottage, Breakstone's, dry curd, NSA	-	53	60 / 1/2 cup
Cheese, cottage, Breakstone's, dry curd, NSA	55	66	75 / 1/2 cup
Cheese, cottage, Breakstone's, dry curd, NSA	55	54	61 / 1/2 cup
Cheese, cottage, Breakstone's, lowfat	-	644	731 / 1/2 cup
Cheese, cottage, Breakstone's, lowfat	-	412	468 / 1/2 cup
Cheese, cottage, Friendship lowfat, NSA	-	94	107 / 1/2 cup
Cheese, cottage, Friendship lowfat, NSA	-	305	346 / 1/2 cup
Cheese, cottage, Friendship lowfat, NSA	-	614	697 / 1/2 cup
Cheese, cottage, Friendship lowfat	-	450	511 / 1/2 cup
Corn, canned, whole kernel, Featherweight, NSA	10	35	40 / 1/2 cup
Corn, canned, whole kernel, Shop Rite	-	250	568 / 1 cup
Corn chips, Health Valley, unsalted	5	20	11 / 2 oz.
Corn chips, Planters	-	545	310 / 2 oz.
Cracker, A & P, unsalted tops	-	830	254 / 10 crackers
Cracker, saltines, A & P	-	1345	382 / 10 crackers
Crackers, saltines, Edwards	-	1110	315 / 10 crackers
Crackers, Food Club, unsalted tops	-	920	261 / 10 crackers
Crackers, saltines, Grand Union, unsalted tops	-	670	190 / 10 crackers

Crackers, saltines, Pathmark, unsalted tops	-	655	52	186 / 10 crackers
Crackers, saltines, Pathmark	-	1255	359 / 10 crackers	
Crackers, saltines, Shop Rite, unsalted tops	-	785	69	223 / 10 crackers
Crackers, saltines, Shop Rite	-	1140	324 / 10 crackers	
Crackers, saltines, Shop & Shop, unsalted tops	-	665	75	189 / 10 crackers
Crackers, saltines, Shop & Shop	-	890	253 / 10 crackers	
Crackers, Sunshine Krispy, unsalted tops	-	700	63	199 / 10 crackers
Crackers, saltines, Sunshine	-	1115	317 / 10 crackers	
Crackers, Nabisco, unsalted tops	-	845	95	240 / 10 crackers
Crackers, saltines, Nabisco	-	885	251 / 10 crackers	
Fish, Tuna, chunk white in water, Chicken of the Sea, low sodium	50	125	24	12 / 3-1/4 oz.
Fish, Tuna, solid white in water, Chicken of the Sea	-	527	60 / 7 oz.	
Juice, vegetable, Campbell's V-8, low sodium	30	10	5	20 / 6 fl. oz.
Juice, vegetable, Campbell's V-8	10	220	440 / 6 fl. oz.	
Margarine, sweet, Mazola, unsalted	1	45	15	6 / 1 tbsp.
Margarine, Mazola	815	305	43 / 1 tbsp.	
Mayonnaise, Balance, prepared without salt	26	10	3	10 / 1 tbsp.
Mayonnaise, Hellmann's	-	360	1360 / 1 tbsp.	
Melba Toast, Devonshire, unsalted rye	16	55	+57	2 / 1 slice
Melba Toast, Devonshire	-	35	2 / 1 slice	
Peanut Butter, chunky, Erewhon, unsalted	-	30	19	9 / 2 tbsp.
Peanut Butter, chunky, Erewhon, salted	-	155	44 / 2 tbsp.	
Peanuts, dry roasted, Planter's, unsalted	<10	20	4	6 / 1 oz.
Peanuts, dry roasted, Planter's	-	485	138 / 1 oz.	
Peanuts, dry roasted, Sweet Life, unsalted	-	171	27	49 / 1 oz.
Peanuts, dry roasted, Sweet Life	-	625	178 / 1 oz.	
Peas, canned, Little Lydia, NSA	10	110	30	125 / 1/2 cup
Peas, canned, Del Monte	-	365	829 / 1 cup	
Potato chips, Hain, unsalted	-	150	36	43 / 1 oz.
Potato chips, State Line, NSA	-	60	10	17 / 1 oz.
Potato chips, State Line	-	595	169 / 1 oz.	
Potato chips, Wise	-	420	19 / 1 oz.	
Pretzels, Featherweight, Low Sodium, NSA	90	25	2	7 / 1 oz.
Pretzels, Reisman	-	1490	423 / 1 oz.	
Ravioli, canned, beef in sauce, Diamel, NSA	45	60	15	136 / 8 oz.
Ravioli, beef, Chef Boy-Ar-Dee	-	405	863 / 7 1/2 oz.	
Rice cakes, organic Arden, NSA	<10	40	9	3 / 1 cake (7.6 g.)
Rice cakes, plain, Arden	37	430	33 / 1 cake	
Soda, seltzer, Shop & Shop, NSA	-	25	71	7 / 1 cup
Soda, club, Shop & Shop	-	35	10 / 1 cup	
Soup, tomato, Campbell's, low sodium, NSA	20	65	11	134 / 7 1/4 oz.
Soup, tomato, Campbell's	-	605	859 / 5 oz.	
Soup, vegetable, Campbell's, low sodium, NSA	25	45	9	93 / 7 1/4 oz.
Soup, vegetable, Campbell's	-	515	731 / 5 oz.	
Spaghetti, enriched, thin, Prince, NSA	<10	30	+20	17 / 2 oz. dry
Spaghetti, enriched, thin, Mueller's	-	25	25	14 / 2 oz. dry
Spaghetti sauce, Diatre, no salt	59	55	31	62 / 1/2 cup
Spaghetti sauce, Palmeri	-	175	199 / 1/2 cup	
Vegetables, mixed, canned, Featherweight, NSA	20	45	11	51 / 1/2 cup
Vegetables, mixed, canned, Shop Rite	-	410	931 / 1 cup	

1 NSA = No salt added
 2 mg = milligrams 8 = grams
 3 Serving unit size usually obtained from label
 4 a dash (-) indicates no claim on label

5 For calculations 1 ounce (oz.) = 28.4 grams
 1 cup (c.) = 8 ounces or 227 grams
 1/2 cup (1/2 c.) = 4 ounces or 113.5 grams
 6. Tbsp. = tablespoon

amounts per 100 grams of product, however, were small. The crackers with unsalted tops averaged about 31% less sodium than saltines with salted tops, but the range was wide, varying from 5 to 48%.

Thirty-six samples made a claim on the label for milligrams sodium per 100 grams of product. Only 44% were found to be within 20% of the claimed amount. In some of these examples the product contained less than 100 milligrams sodium per 100 grams, an amount probably not excessive except for those on the strictest low-sodium regimens.

Milligrams of sodium per serving of the particular food are also shown in the Table. Note that serving sizes are not always comparable between low-salt and ordinary products since the serving size was usually obtained from the label. For example, in canned beans, beets, carrots, peas, corn, and mixed vegetables, the serving size for the low sodium product is one-half cup and for the ordinary product it is one cup. The serving size for low-sodium tuna fish was stated as being about one-half that of ordinary tuna fish. For low-sodium pretzels the serving size was listed as 5 grams, about one-sixth of an ounce. We considered this to be unrealistic and calculated the sodium in 28.4 grams, a one-ounce serving.

The sodium content of table salt (sodium chloride) is about 39%. Thus, to approximate how much common table salt a product contains the milligrams of sodium per 100 grams is multiplied by 2.5. This value divided by 1000 will give the percentage of salt in the food. For example, in ordinary bread, 725 milligrams sodium per 100 grams times 2.5 divided by 1000 equals 1.8% salt. For regular beef broth 4220 milligrams sodium per 100 grams times 2.5 divided by 1000 equals 10.6% salt.

Summary

The data in this Bulletin show the sodium in a range of common foods. Additionally they allow consumers to compare the amount of sodium in products purporting to be low in sodium with the ordinary product so that they may select their purchases according to their

nutritional needs.

References

1. Analytical Methods for Atomic Absorption Spectrophotometry. 1976. Perkin-Elmer, Norwalk, CT.
2. Code of Federal Regulations, Title 21-Food and Drugs, sec. 105.69 (21CFR 105.69), 1980.
3. Council of Scientific Affairs. 1979. American Medical Association Concepts of Nutrition and Health. J. American Medical Assoc. 242: 2335-2338.
4. Hankin, L., D. Shields, and J.G. Hanna. 1980. Quality of Cottage Cheese and Ricotta Cheese. Bull. 791, The Connecticut Agricultural Experiment Station, New Haven, 16p.
5. Novitch, M. Statement before the Subcommittee on Investigations and Oversight, Committee on Science and Technology, House of Representatives, April 14, 1981.
6. Recommended Daily Dietary Allowances, 9th revised ed., Food and Nutrition Board, National Academy of Sciences, National Research Council, Washington, DC, 1980.
7. Smith, R.J. 1981. FDA plans action on sodium in foods. Science 212: 1373.

Acknowledgements

Lester Hankin is Biochemist (Department of Biochemistry and Genetics) and J. Gordon Hanna is Chief Chemist (Department of Analytical Chemistry) at The Connecticut Agricultural Experiment Station, New Haven. Sodium analyses were made by Mary Alice Illig (Department of Analytical Chemistry). Edward Hawley, Chief of the Food Division of the Connecticut Department of Consumer Protection, arranged for collection of samples by inspectors Frank Zullo and Louis Palumbo. Requests for additional copies of this Bulletin should be addressed to Publications, Box 1106, The Connecticut Agricultural Experiment Station, New Haven, CT 06504.



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